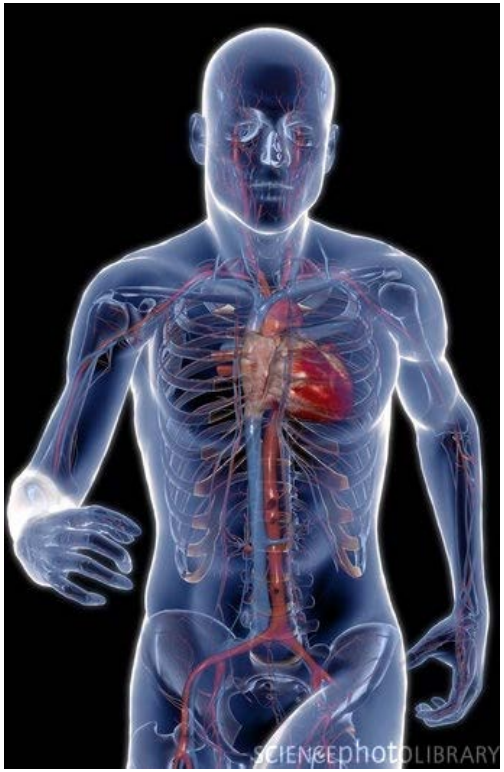
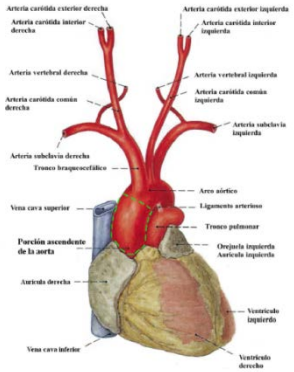
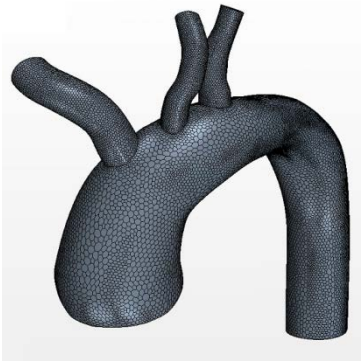
Aplicación de metodos numéricos en la simulación del flujo sanguíneo en el sistema arterial







Damon Afkari
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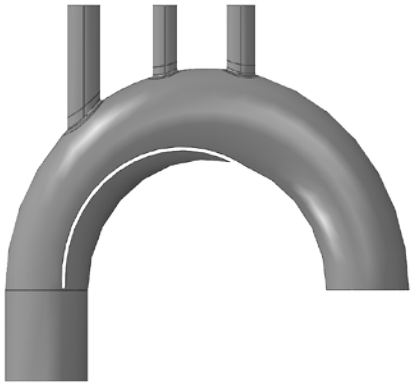
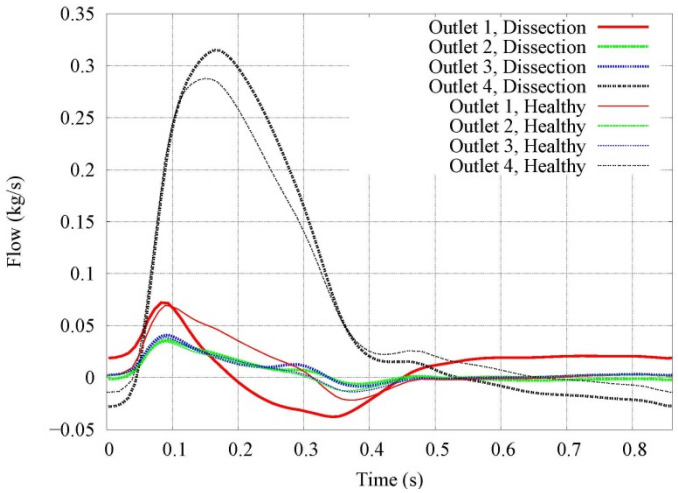
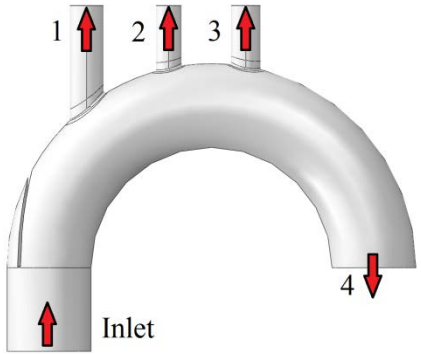
Universidad Politécnica de Madrid

Introducción

- ¿Cual es el reparto de flujo entre las salidas de una arteria dañana?

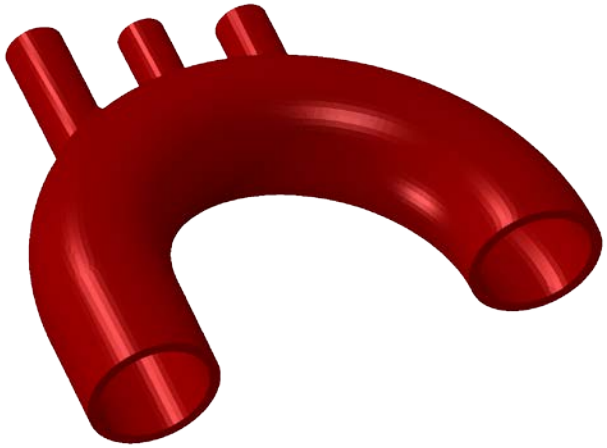


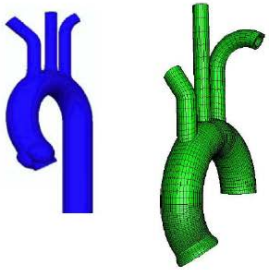


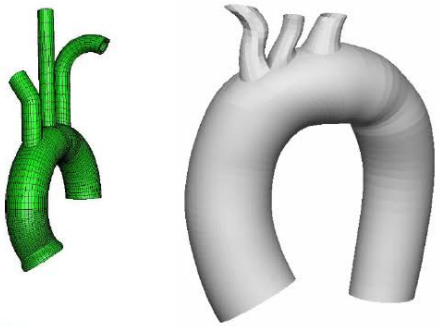


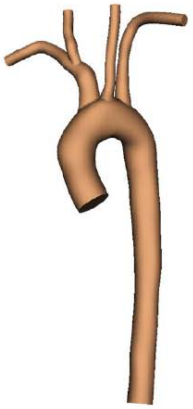
Introducción

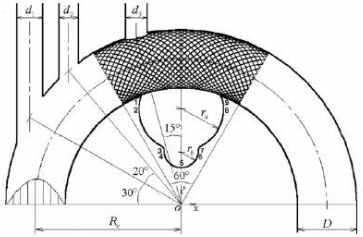
- La selección de la geometría ideal



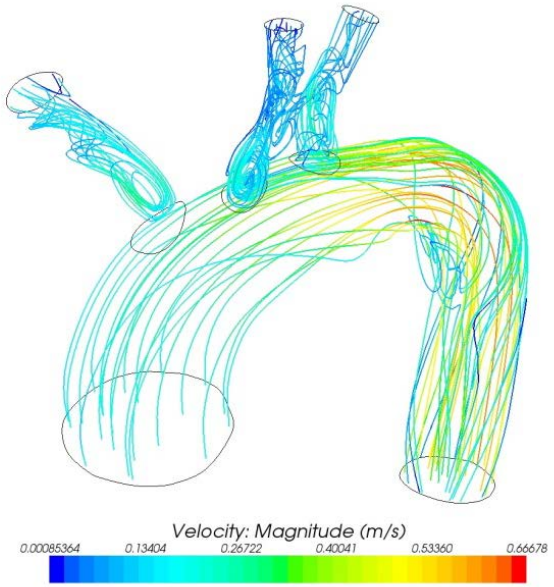


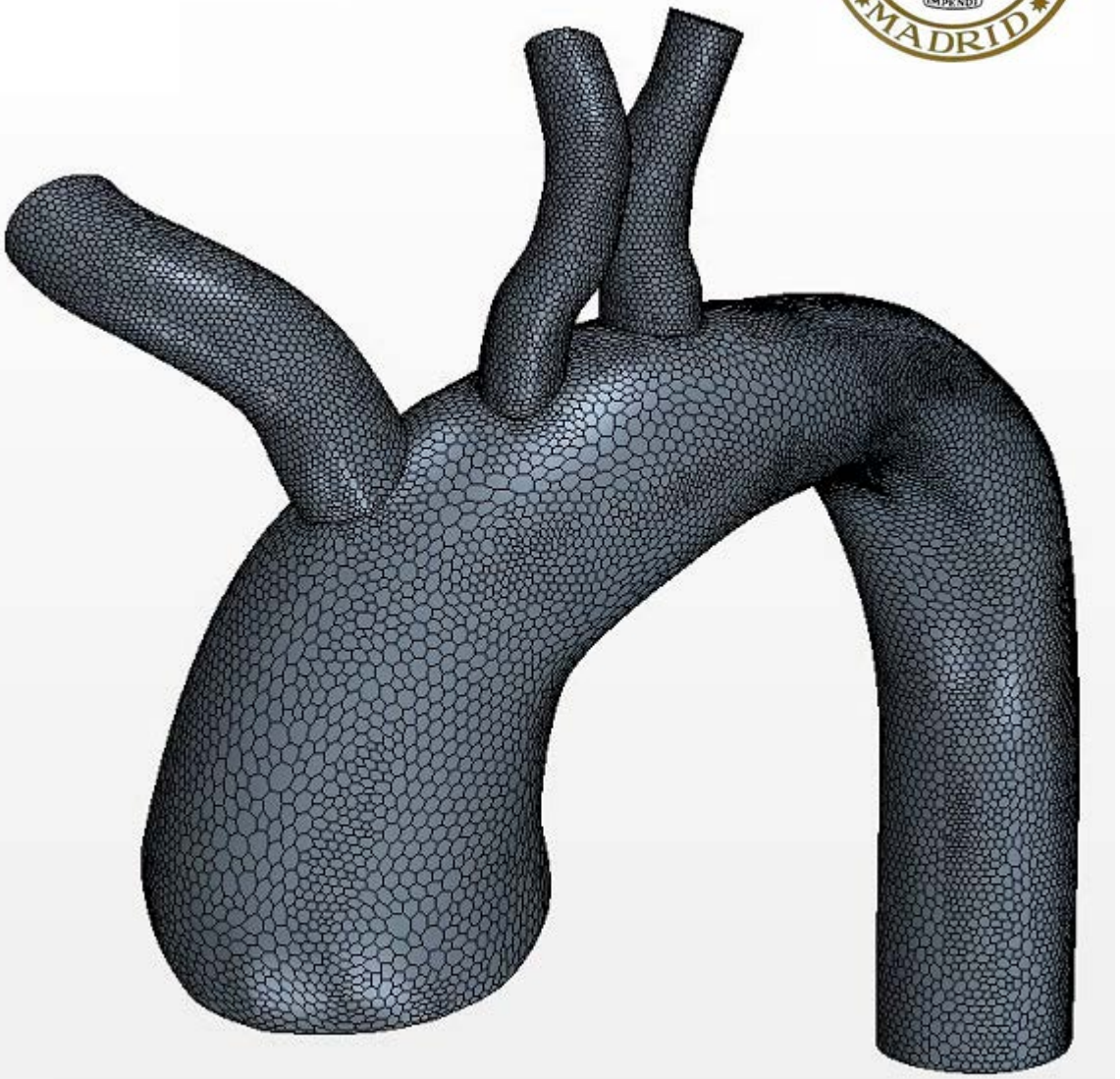






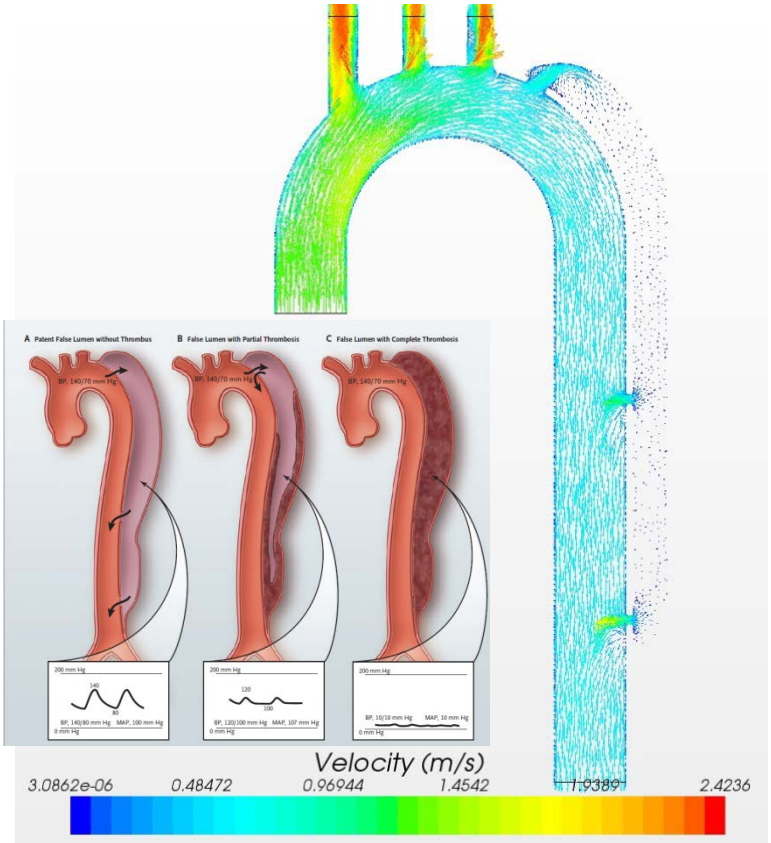
Geometría de un paciente

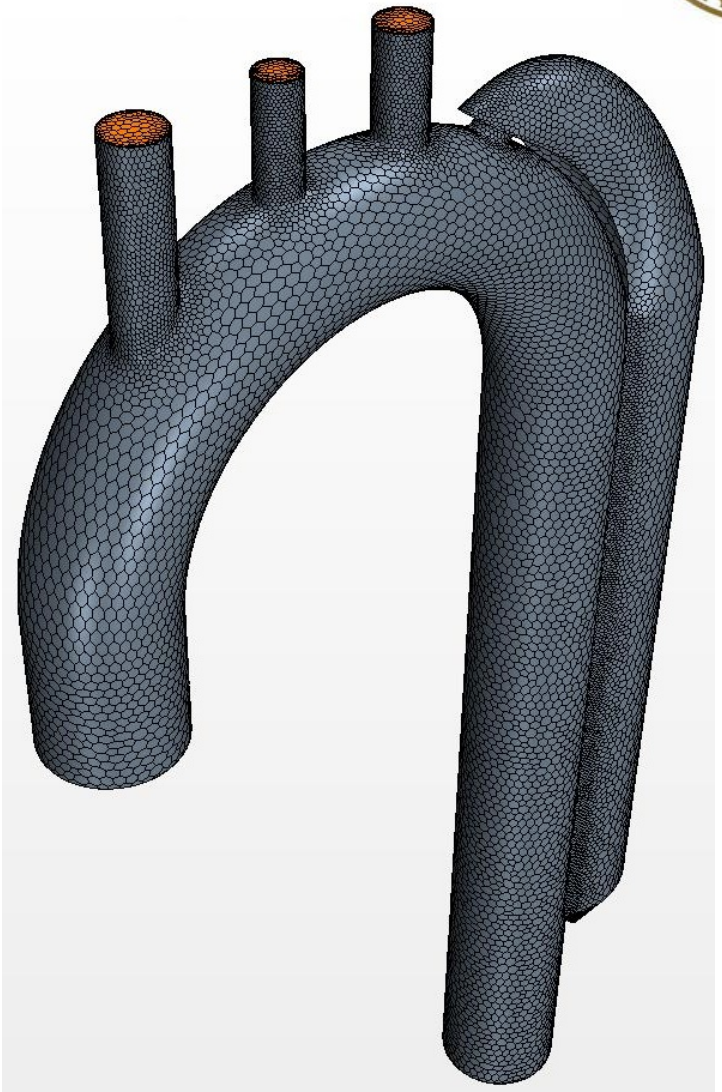




Disección
en la aorta descendiente

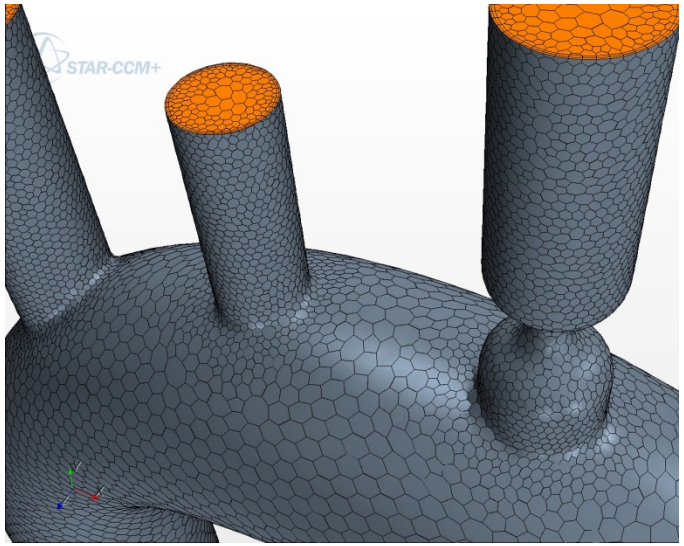
- La animación de vectores de velocidad

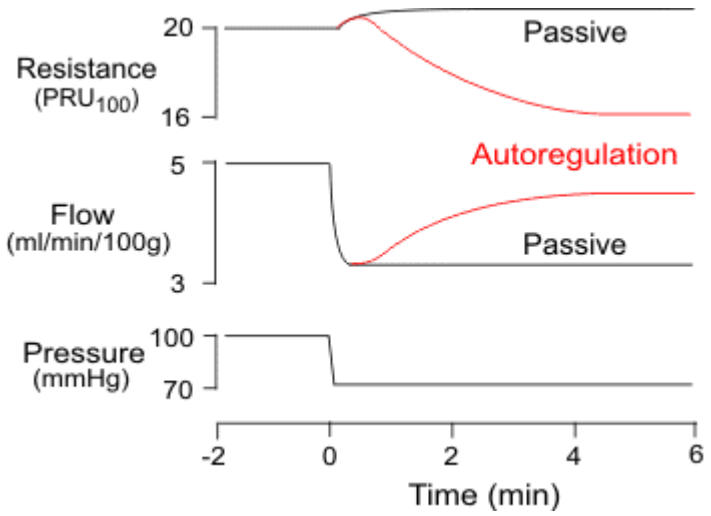




A+IPBC: Autoregulation

- Autoregulation: A manifestation of local blood flow regulation (Cardiovascular Physiology Concepts, Richard E., Ph. D Klabunde)
- It is defined as the intrinsic ability of an organ to maintain a constant blood flow despite changes in perfusion pressure (Percentage of flow distribution)
- if perfusion pressure is decreased to an organ (e.g., by partially occluding the arterial supply to the organ), blood flow initially falls, then returns toward normal levels over the next few minutes





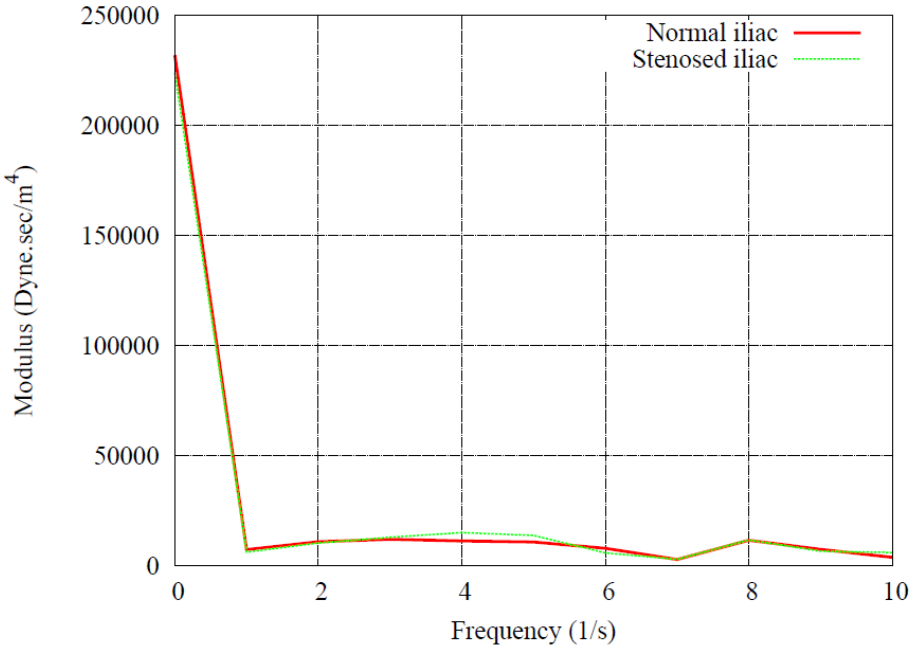
A+IPBC: Impedance

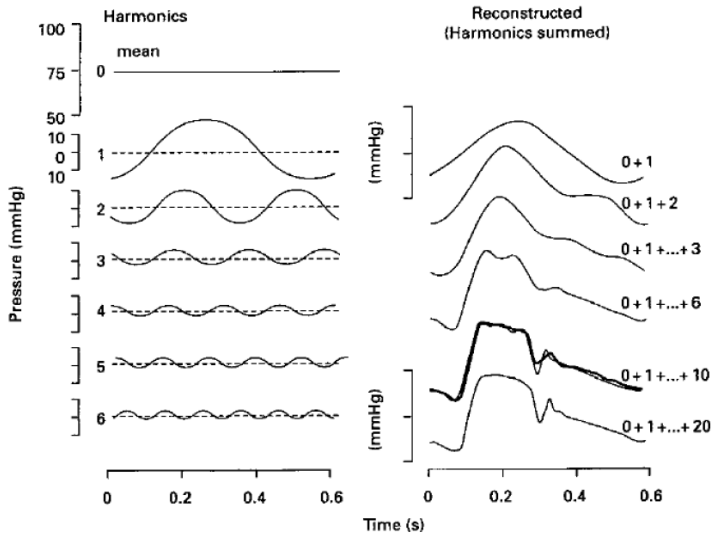
- Z, Impedancia

$$Z = P / Q$$

P, Presión en dominio de frecuencia

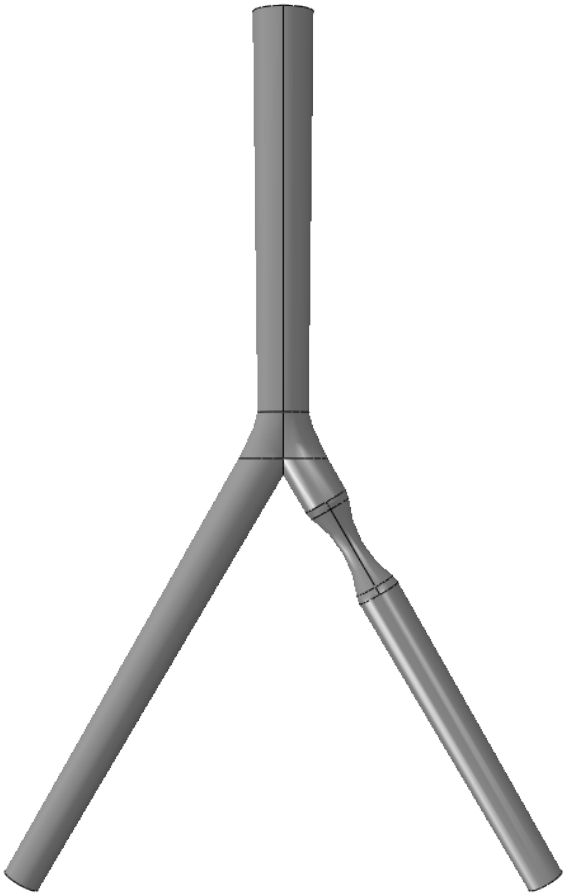
Q, Flujo en dominio de frecuencia

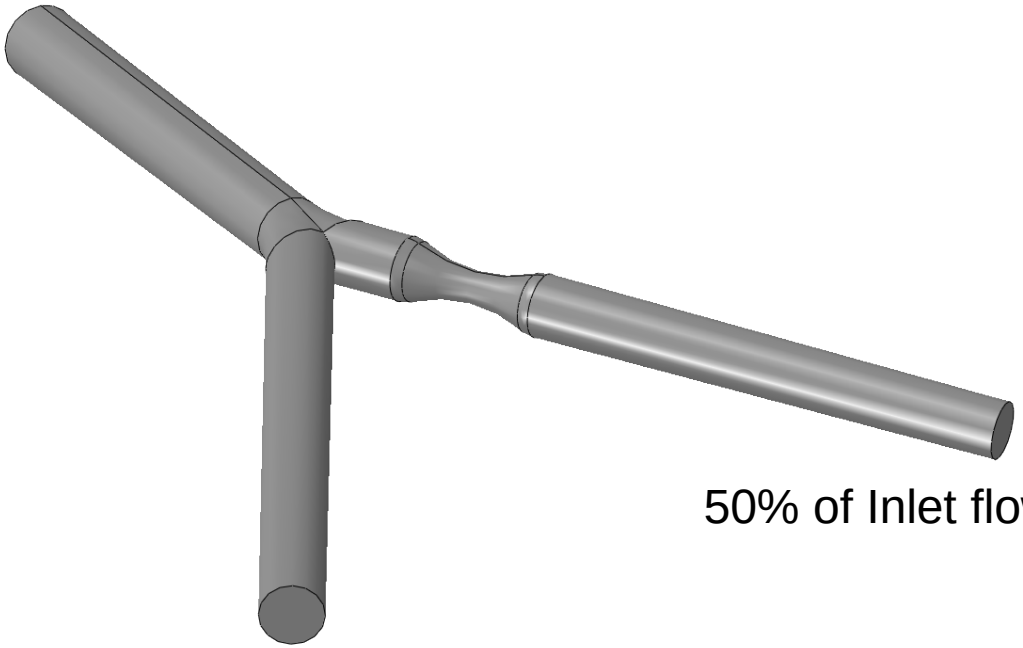




Modelo de Validación

- Reparto de flujo: 50% - 50%
- Aplicación de A+IPBC



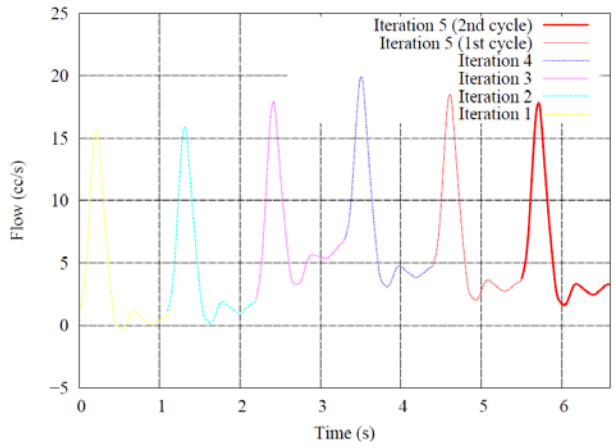


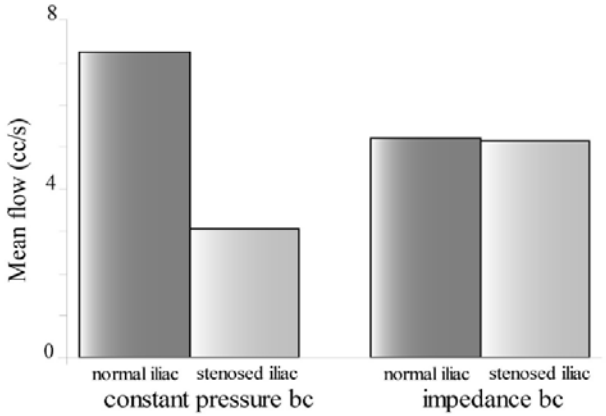
50% of Inlet flow

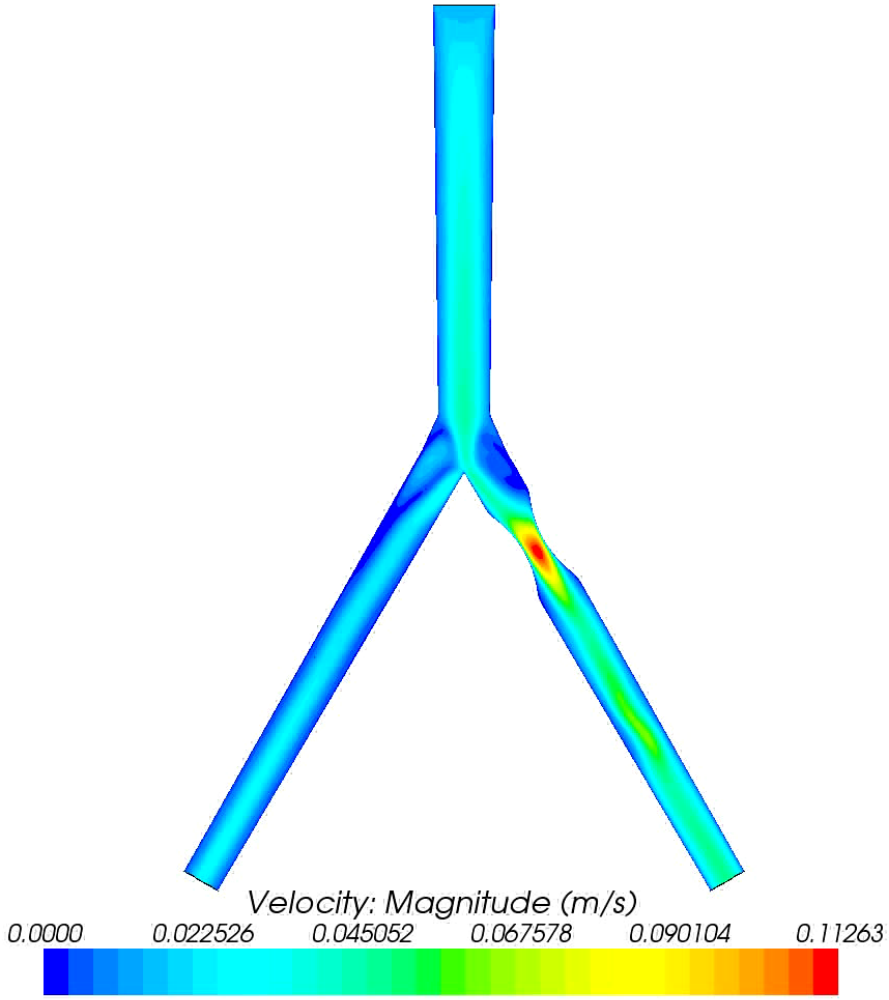
50% of Inlet flow

Modelo de Validación

- Velocity vectors (animación)

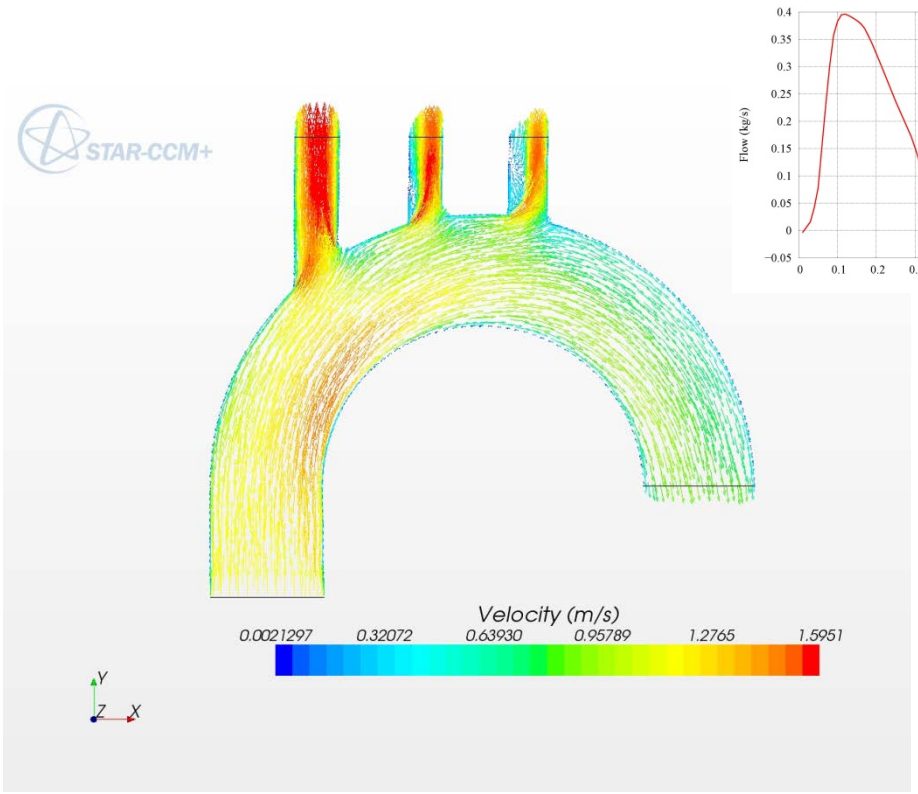


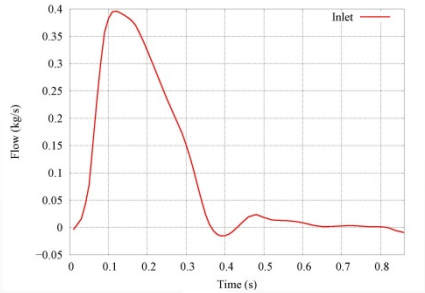


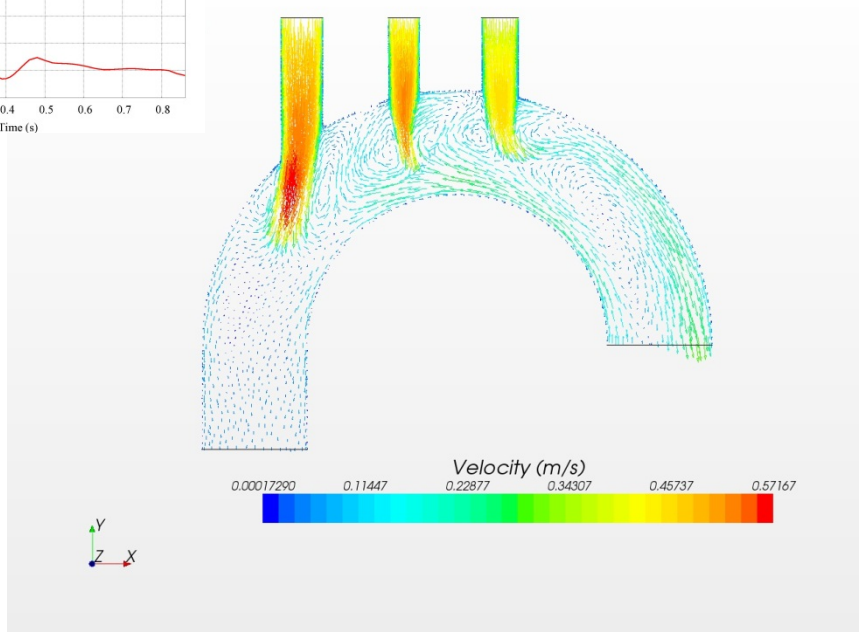


Cayado Aórtico Sano

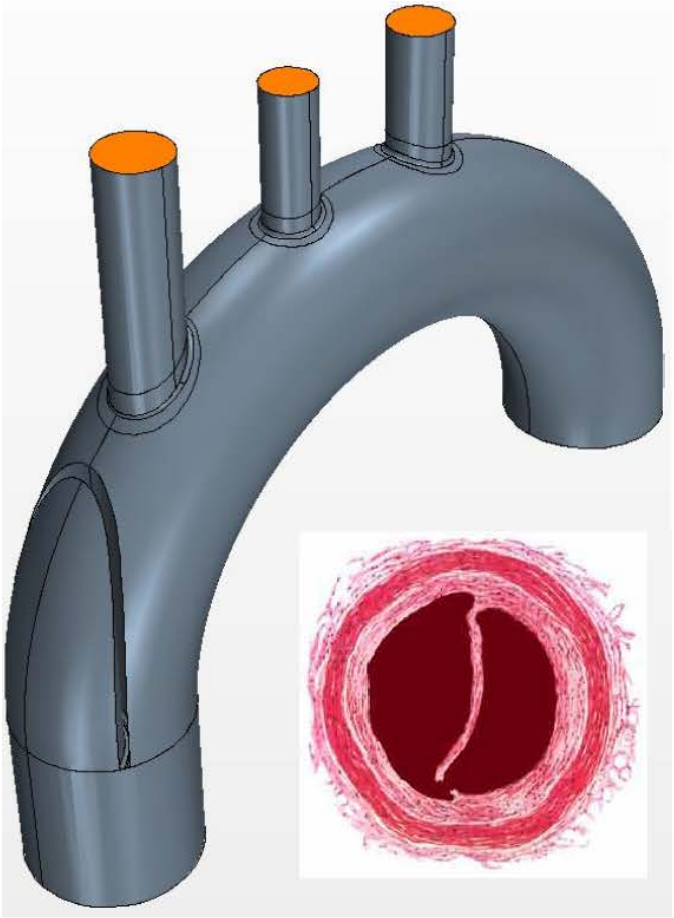
- Velocity vectors (animación)

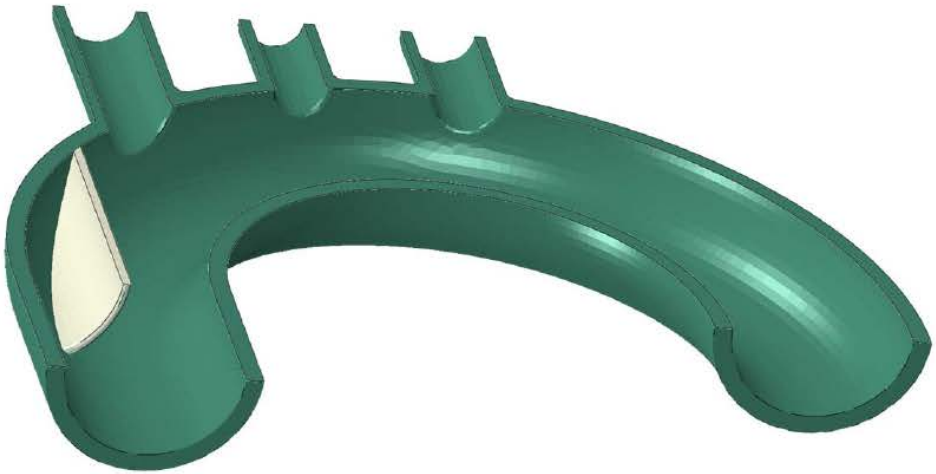


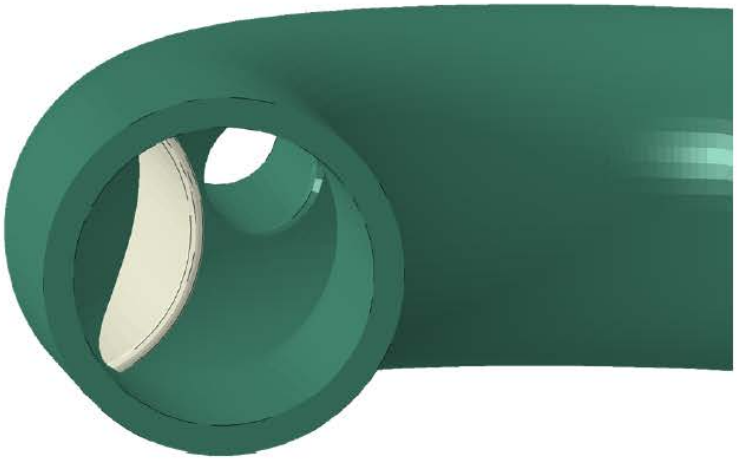




Cayado Aótico Diseccionado

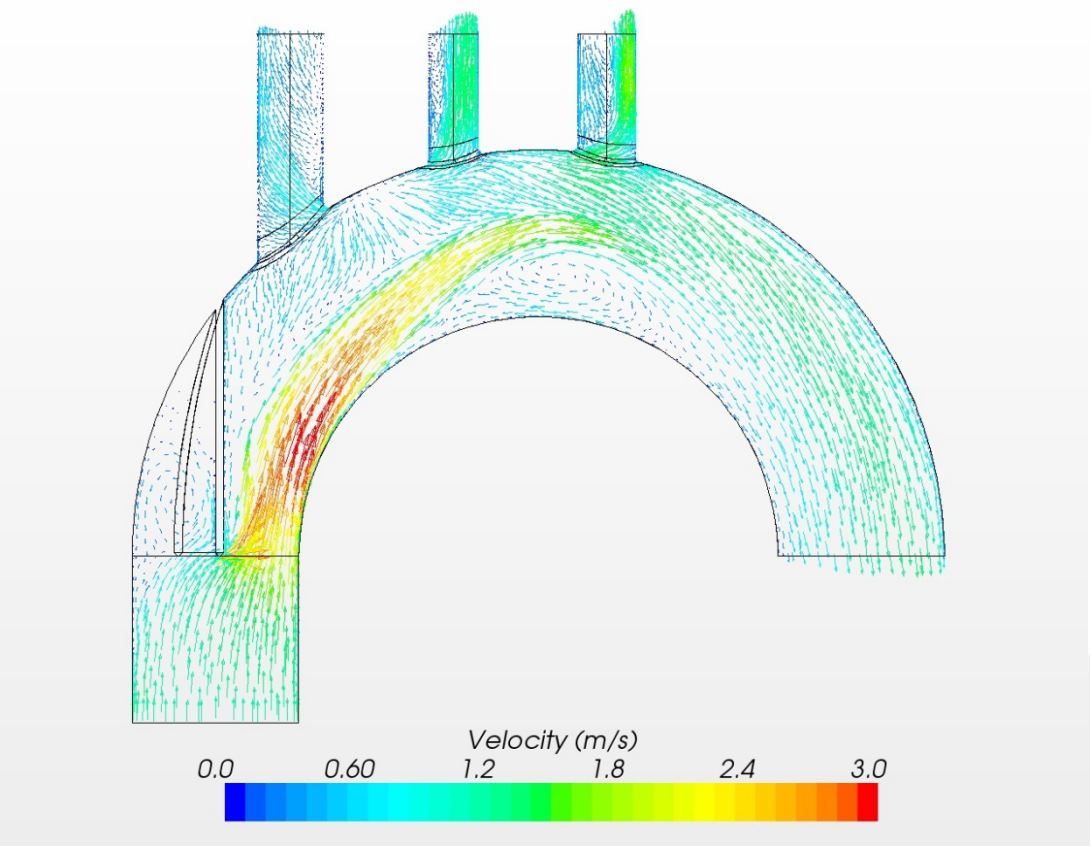


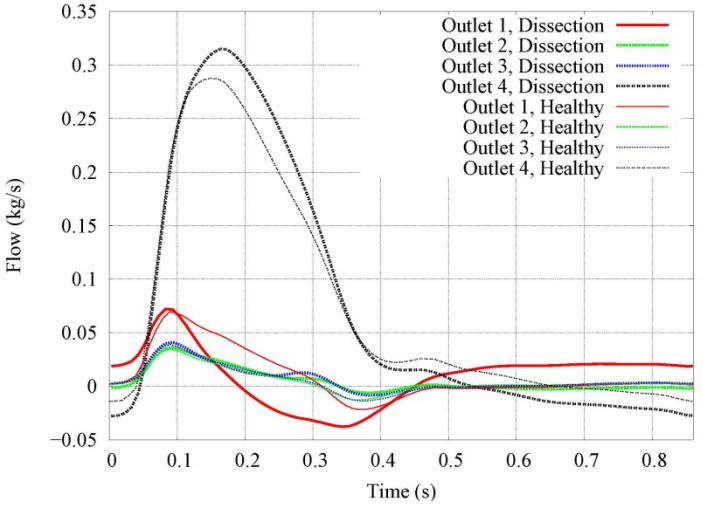




Cayado Aótico Diseccionado

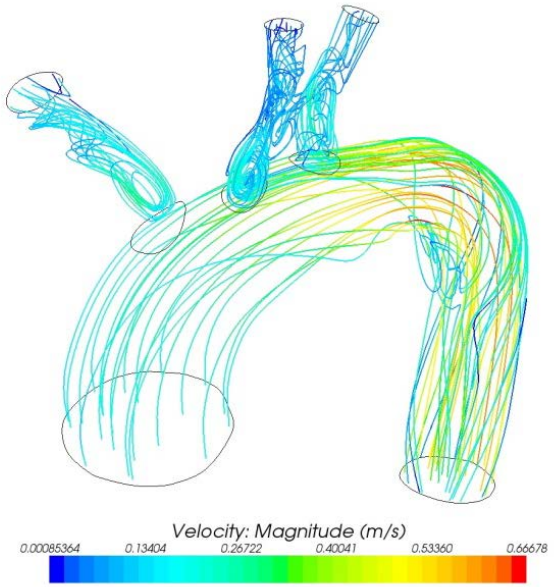
- Velocity vectors (Animación)

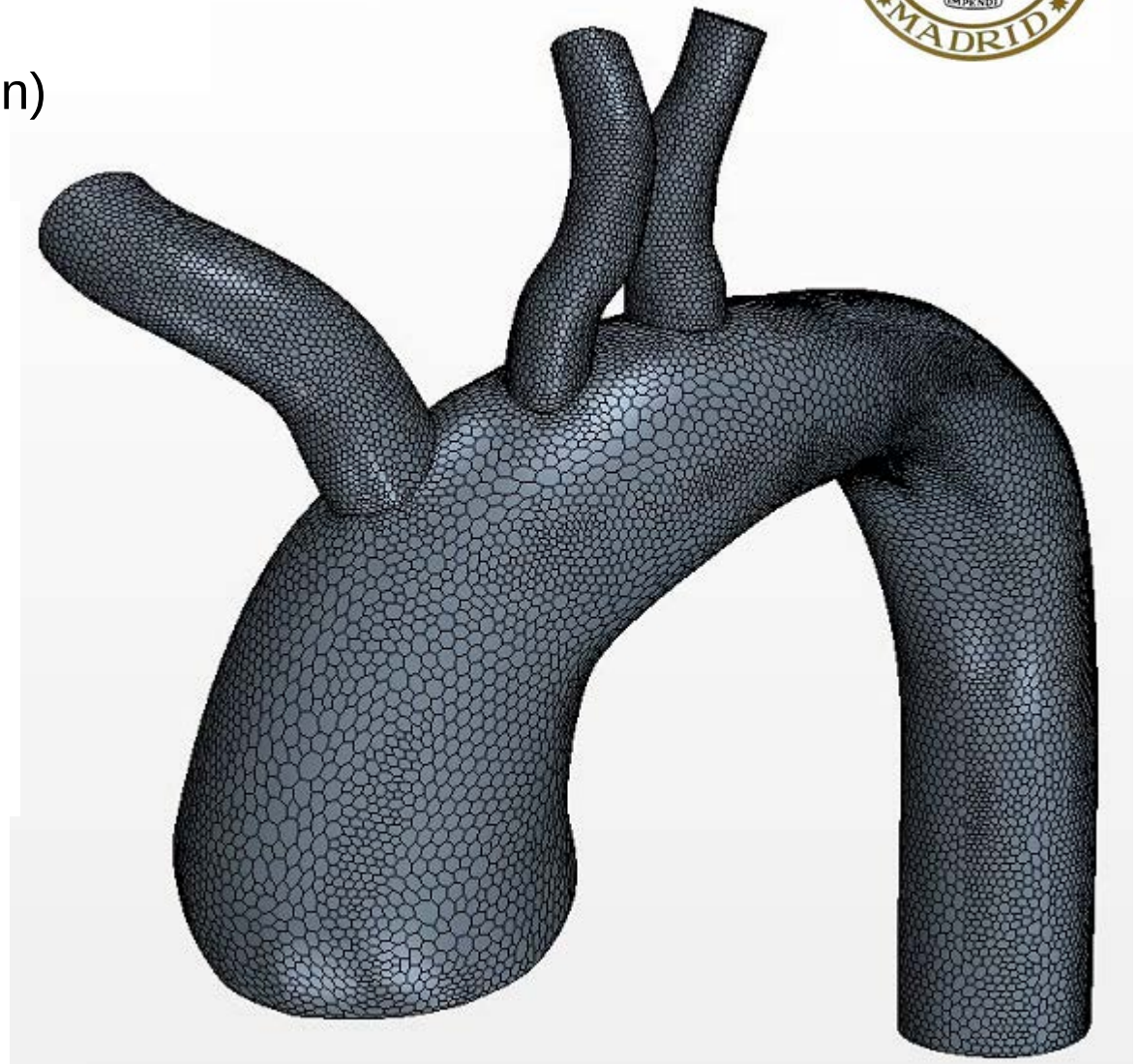




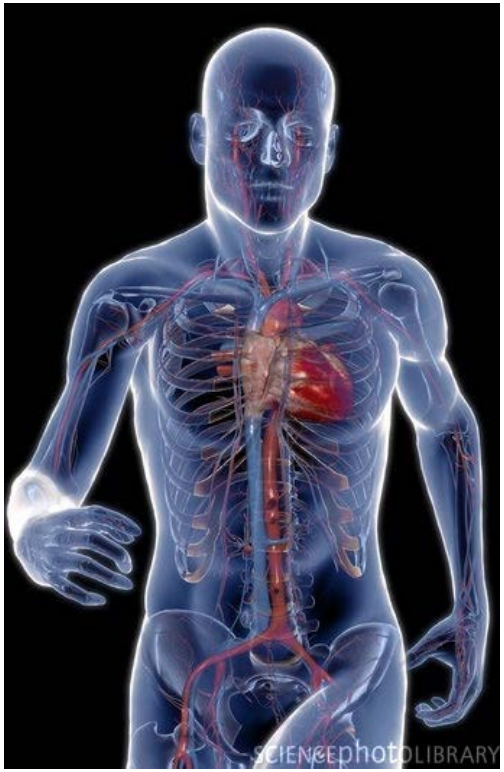
Geometría de un paciente

- Streamlines (animación)





Gracias!



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